UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

ELECTRONIC MAIL

June 20, 2014

Mr. Derek W. Tomlinson, P.E., P. Eng.
Project Coordinator
Geosyntec Consultants, Inc.
1787 Sentry Parkway West
Building 18, Suite 120
Blue Bell, PA 19422

RE: North Penn 5 Superfund Site, Operable Unit 2
Pre-Final (90%) Design Submittal, dated April 28, 2014,
as required by Administrative Order (Docket No. CERCLA-03-2012-0205DC)

Dear Mr. Tomlinson:

The U.S. Environmental Protection Agency (EPA) has received and reviewed the subject document. The 90% Design is approved provided that the attached comments are addressed sufficiently in a final version of the document. According to Paragraph 25.b.5, "Upon EPA approval, the Final Design shall be deemed to be incorporated into this Order and made an enforceable part hereof." In order for the Final Design to be enforceable, sufficient detail relating to project endpoints and schedule should be incorporated as indicated in our attached comments.

Please submit the Final (100%) Design within thirty (30) days of the date of this letter. To expedite review of the revised document, please submit responses to our comments and a revised redlined electronic version of the 90% Design along with the revised final 90% Design.

If you have any questions, please contact me at 215-814-3018.

Sincerely,

Sharon Fang, P.E.
Remedial Project Manager

Attachment
cc: Dennis Kutz, PADEP
Ex. 4 – CBI, HGL
Allison Gardner, EPA
File

NP5 OU2 90% Design Comments
June 20, 2014

RPM General Comments

1. If Phase 1 is successful, a RD Addendum should be submitted for the extension of the trench for Phase 2. Please use this terminology throughout the design document instead of Phase 2 design since this is "the RD."

2. Certain terms have a Superfund legal implication associated with them. For example Operation and Maintenance "O&M" is specifically one year after Operational and Functional "O&F" and is defined for the entire project. Please refer to the RDRA Handbook at http://www.epa.gov/superfund/cleanup/rdrabook.htm (Specifically the Contractor Completion Activities starting on page 82). For Phase 1 steps, such as Pre-final & Final Inspections, qualify them by calling them "Phase 1 Pre-Final Inspection," "Phase 1 Final inspection," etc. To avoid confusion, the term "Phase 1 Performance Monitoring" should be used for the monitoring after KB1 injection. Also, "Construction Completion" denotes all physical activity completed on-Site for the Interim ROD. Therefore, please do not use this term in relation to Phase 1.

3. The RDRA Handbook Page 82 states "Ensure the designer incorporates into the design documents (CQAP) the tests that are necessary to demonstrate that the remedy is operational and functional." My understanding is that those tests would be demonstrated during the Phase 2 performance monitoring data from the first two years. If that is correct, please ensure the specific criteria is included in the CQAP.

4. Describe how saturated soils that are excavated beneath the water table and the associated water be handled. Please account for this in the Waste Management Plan.

5. Currently, there is no Decontamination area or traffic flow plan. Please include these in the Health and Safety plan. Also, the Waste Management Plan could reference the Decontamination Plan.

6. Sample and analyze the water pumped from RI-27D after pumping for the batch has been completed and also sample and analyze the water in the frac tank.

7. Legal discussions do not have a place in a technical document, such as this Remedial Design. Please delete the following:
   - Page 24, Third bullet
   - Page 9 Section 2.4, Last paragraph
   - Figures 5 & 6.

8. Add language into the RD that acknowledges the need for Phase 2 shallow and intermediate bedrock wells. Actual number and locations will be presented in the RD Addendum for EPA's approval.

9. Will monitoring continue if Phase 1 is deemed unsuccessful? State if it will and at what frequency. Also, add language stating that the anticipated duration of Long-Term Monitoring will be included in the RD Addendum.

10. "O&M" Plan should be renamed "Phase 1 Operational Activities" and include the plan for Phase 1 Performance Monitoring and Phase 1 Long-term Monitoring. Also, reference the sections in the design that include the analyte and frequency of sampling during the Phase 1 performance monitoring period and state the analyte and frequency of sampling for the Phase 1 Long-Term Monitoring period. A Long-Term Monitoring Plan should be included in the RD Addendum for the entire remedy and should include the analyte and frequency of sampling during the Phase 2 performance monitoring period and thereafter.

11. Based upon the structure of the bedrock trough, it is expected that some PMWs northwest of the Phase 2 injection trench may be dry. Provide a contingency in the event a PMW is dry.

12. It is unclear at what point the injection system will be removed from Site and if the other features (trench & PMW) will be removed. Clarify what will be removed and when.

13. An independent quality assurance (IQA) representative as required by the UAO Paragraph 25.b.3.iii and 25.b.3.ix. Please add this role

14. Is the Resident Engineer the QA official? Is this a potential conflict of interest?

15. Has One Pass been documented to work in weathered bedrock? What is the height of the cut? Is no geomembrane proposed for Phase 2 or can it be installed by One Pass?

RPM Specific Comments

16. Page 4 references Figure 2. Please ensure the roads that are referenced are labelled on Figure 2.

17. Page 4 Section 2.1.1. Supply the street addresses for Stabilus, BAE & Whistlestop Park.

18. Page 7, Section 2.2 references NPWA supply well NP-21. Please place the location of NP-21 on an existing figure and reference the figure in the text.

19. Page 8 references NPWA supply well NP-21. Please place the location of NP-21 on an existing figure and reference the figure in the text.

20. **Figure 4.** Draw an open contour to the left of TW49 & TW50 or dash the line and add dashed line to the legend as "approximated extent, not yet confirmed."

21. **Page 12, second paragraph** states "amendments will fill the bottom 5'." What mechanism will limit the amendments to the bottom 5'? Volume calculations? Geotextile? Alarm sensors?

22. **Page 17, Section 4.2.4's last paragraph** states that application will be conducted when ambient temperature is above freezing at all times. Will the lines be cleared & the equipment winterized? Add appropriate language as to what will be done and when.

23. **Page 36, Sixth bullet** states access is made available with "reasonable restrictions." Can you share the definition with EPA?

24. **Page 28, End of first paragraph** states that pump delivery may be allowed. Please give threshold scenarios that would trigger the use of pump delivery. Also, state when notification will be given to EPA, e.g. 5 business days prior to pumping.

25. **Page 29, Section 5.1.4** EPA request notification of changes at least X days prior to use of an alternate water source.

26. **Figure 7, RA Schedule.** The RAWP & CMP technical meetings are on the same day (January 15th). Is it envisioned that these would be combined?

27. **Page 35, Section 7.4** references Section 10, but no project team is included. Perhaps reference section 9, FSP 9.1.

28. **Section 4** Acknowledge if VI assessment requires mitigation, Long-Term Monitoring Plan should include periodic sampling until the groundwater is cleaned to MCLs.

29. **Page 45** Section 9.2.2 &9.2.3 should reference Figure 9 for the location of performance monitoring wells.

30. **Page 48 & 49** list Investigation Siting then Subsurface Utility clearance. Will Utility Clearance be performed prior to siting the trench footprint?

31. **Page 53, Section 9.3.8.** Provide a general location for geotechnical soil boring on a figure and reference that figure. Also provide the rationale for the number of geotechnical soil samples to be taken.

32. **Page 57** states "results used to select appropriate screen interval." Define "appropriate," e.g by maximum water yield or by maximum VOC level.

33. **Page 62.** Specify the frequency of water quality meter calibration- Prior to each well, prior to each day, or prior to each event?

34. **Page 75.** When will the registry be searched, covenant drafted & covenant enacted? "Prepared as part of the RAWP" is too broad. Will the draft covenant be part of the RAWP for EPA's review? State how many days after EPA approval of the RAWP the covenant will be filed.

35. **Page 79,** RA Waste Management Plan- Acknowledge the UAO paragraph 27 that requires written notification to the appropriate State environmental official in the receiving facility's state and to the RPM 21 days prior of off-Site shipment.

36. **Table 4** RA Cost Estimate. Add that a Cost Estimate for Phase 2 will be included in the RD Addendum.

37. **Figure 4 & Figure 9** should have a dashed line by TW51 & TW-49

38. **Figure 7.** Does Phase 1 Long Term Monitoring (LTM) follow Performance Monitoring for Phase 1? Show a placeholder for Phase 1 LTM with an arrow extending outwards so that it's clear that it will continue during Phase 2?

RPM Appendix A, Remedial Design Drawings

39. **General.** Ensure cross referencing throughout the drawings is correct. For example, Sheet 9 has  and it is noted as  on Sheet 5

40. **Sheet 4.** Please include TCE levels from PDI in parenthesis below the location name. or NS if not sampled or dry if dry.

41. **Sheet 5.** Delete "proposed" from the legend and notes.

42. **Sheet 7** CRC is Vance Evans 215-814-5526. Delete PADEP Incident Reporting & State/Local CRC.

43. **Sheet 8.** Where is groundwater expected to be in the cross section B?

44. **Sheet 9.** Please add RI23 and other existing wells that are to be used for performance monitoring.

RPM Appendix B, Specifications

45. Should there be a spec for the Geotextile?

46. Define "Owner's Representative" in the CQAP.

47. Pdf page 138 Is MMI Engineering the RA contractor?

48. Pdf page 139 SEC should be approved locally.

49. Pdf page 149 Project schedule is to be updated monthly. Perhaps weekly during physical installation/injection & then quarterly during performance monitoring/long-term monitoring.

50. Pdf page 171 Include the trigger & possible methods for abatement.

51. Pdf page 174 &175 When will the contractor be removing material & equipment? Define temporary facilities. Request EPA have temporary space with internet connectivity during physical installation/injection (approximately Jan 2015- May 2015)

52. Pdf page 181 Reference the disposal of the dewatered groundwater in the Waste Management Plan.

53. Pdf page 188 Add Check out meeting to the Schedule for Phase 1 & Phase 2

54. Pdf page 190 How is the Close out meeting different from checkout meeting? If different, add to schedule.

55. Pdf page 192 Specify depth of topsoil.

56. Pdf page 294 Imported fill requires compliance with PADEP Clean Fill Regulations.

57. Pdf page 301 states not to backfill against concrete until 28 day strength. Define "structural concrete." Is that any cast in place concrete?

58. Pdf page 313 Will there be silt fencing to prevent erosion?

59. Pdf page 329 Compaction of topsoil may prohibit seed growth.

60. Pdf page 341 Trench shielding should require a submittal for the RE's approval.

61. Pdf page 344 State timeframe for "all plantings which have died."

62. Pdf page 345 State criteria for seed when done. Usually in terms of a percentage.

RPM Appendix C, Construction Quality Assurance Plan (CQAP)

63. **Page 6 Section 3**, Will the trench be abandoned in place? When will the EISB Equipment be dismantled?

64. **Page 7** Preconstruction meeting must include the Resident Engineer and EPA/EPA representative. PC & State regulators are strongly suggested.

65. **Page 8** Progress meeting should include regulators/EPA oversight

66. **Page 8/9** Work Deficiency Meeting Meetings. Regulators will be notified and resolution should be noted on the daily report.

67. **Page 11** Sediment Erosion Control should be "as approved in accordance with the local Soil Conservation District."

68. **Page 21** Rename Construction Completion Report "Phase 1 Remedial Action (RA) Report." See Page 84 from the RD/RA guidance for information that should be included in this report. Also, state the timing by which the report will be submitted, e.g. 60 days after the final inspection.

69. **Page 25** Figure 1 Add EPA oversight contractor TBD. Also, who is the Health & Safety Officer & Independent QA person & who will those people report to?

RPM Appendix E, Quapp

70. **PE Samples** timing should be coordinated with Jay Burman to be run prior to analysis of any other samples.

71. **Page 8. Project Org Chart.** Include IQA rep.

72. **Page 11** RPM Phone # is incorrect.

RPM Appendix F, Health & Safety Plan

73. **Page 28** Why are inspections "not applicable?" Should perform periodic inspections during performance monitoring & long term monitoring.

PADEP Comments

74. **Section 4.2.2 Applicable or Relevant and Appropriate Requirements:** The report does not acknowledge PADEP's soil standards. Include a reference throughout the document that

soil analysis performed during the PDI exceeded PADEP residential standards in addition to exceeded EPA's Region 3 RSLs.

75. **Section 5.1.2.5 targeted Groundwater Mounding:** The calculation for water head above static has 0.5 ft X 50% safety factor = 1 ft of water head above static. 0.5 X 0.5 = 0.25. Revise the text so that the safety factor is 200% for one foot of water head above static.

Hydro comments

76. **Sections 5.1.4 and 9.3.7** Verify that the dilution water has no VOCs by sampling at the beginning and at the end of pumping well RI-27D for use as dilution water. When sampling, the well should be purged using the same pumping rate as the one that will be used to pump the water for dilution make-up and sampled after three well volumes. Low-flow sampling is not the appropriate method for the data objective.

77. **Section 9.3.16.** As a general rule, low-flow sampling is not an appropriate sampling method in wells with screens or open intervals greater than 10-20 feet in length or that intercept more than one fracture/fracture zone or zones with differing permeability. A modified low-stress technique is preferable when feasible. Add in language to reflect how the samples will be collected in the field, and the associated decision points for modifying the sampling technique.

Ft. Meade Comments

78. Subsection 9.3.7 Sampling of Bedrock Monitoring Well RI-27D second from the last paragraph last sentence reads, "The collected groundwater from bedrock monitoring well RI-27D will be analyzed for VOCs via USEPA Method 8260B SOM 1.2." However, all other aqueous VOC analyses appear to be analyzed by Method 5030C. USEPA Solid Waste (SW) 846 Methods 8260B and 5030C are reference methods and as such allow the user plenty of flexibility. US EPA Organic Statement of Work (SOM01.2), quoted above, is however very descriptive with respect to organic analyte analysis. The reviewer is unclear why the QAPP is mixing methods as opposed to using one for the analysis of all aqueous VOC performance monitoring samples. The analytical method to be used for the analysis of VOCs in groundwater should be made clear and remain consistent throughout the QAPP.

79. Subsection 9.3.7 Sampling of Bedrock Monitoring Well RI-27D second from the last sentence of the last paragraph lists detection limits as being summarized in Table 3, but detection limits are actually found in QAPP Worksheet #15A.

HGL General Comments

80. Portions of this document are too generic for this stage of the design process. The 90% design document should take into account all available information related to OU2 of the site in question. Revise wording such as EVO delivery will be accomplished using low pressure that is "likely hydraulic head of the batch mixing tank." These types of details should have been finalized by this point in the design process; the 90% design submittal should reflect specific elements of the design. Revise the document accordingly.

81. Revise the document to include discussion of a contingency approach that will be used to achieve RAOs in case Phase 1 results are determined to constitute a failure and Phase 2 is not implemented. This comment also was made on the 60% Design Submittal, and it was not fully addressed. Sections 6, 7.7, and 9.2.2 include language regarding performance of a focused feasibility study and/or revision of the approach in the event that Phase 1 fails to meet the remedial goals, but that is the extent of the contingency plan. Additional details regarding possible alternative approaches would be useful.

82. The treatability study data analysis concluded that a buffered EVO amendment is required. For the treatability study, buffering was provided through sodium bicarbonate addition. Section 5 specifies how much EVO solution will be required, but does not discuss how this solution will be buffered. Will sodium bicarbonate or some other buffer be added to the EVO solution to reflect the findings of the treatability study that the buffered amendment outperformed the unbuffered amendment addition? If so, how much buffer will be included in each batch of EVO solution? (Also see general comment #3.) This comment also was made on the 60% Design Submittal, and it was not fully addressed. While a range of buffer percentages is presented on Drawing 11, the buffer type is not stated. Additionally, Statement 5 of Section I on Drawing 11 indicates that buffer quantities will be finalized following treatability studies. Given that treatability studies have been completed, the buffer quantities should be known for the 90% design submittal, unless they not yield sufficient information to design the injection mixture. Modify the statements in Section I to provide additional information on the injection mixture.

83. Using the analytical results from only one sample to provide the geotechnical characteristics for the entire site is questionable from an engineering standpoint. Consider performing additional geotechnical analyses to ensure that the observed characteristics (particularly permeability) are applicable across the entire site.

84. To avoid the impression that the plume is fully delineated to MCLs, qualify the use of the word 'delineation' throughout the design report by stating "delineation to 100 µg/l." The text and figures should be revised accordingly.

85. The remedial design identifies a finite period for substrate injection but does not specify the criteria that will be used to determine when EISB through amendment injections should cease. Please include the criteria for determining when the site will proceed from active EISB to groundwater monitoring only.

86. The text and drawings indicate that the site soil will be reused as trench backfill. Describe how this soil has been/will be characterized to demonstrate that it is not contaminated. Indicate what criteria will be used to determine whether the excavated material can be reused.

87. It appears that 1-inch hose will be used to convey the amendment solution from the mix area to the trench injection wells. Describe how this hose will be protected from damage when it is in use.

88. The Sediment and Erosion Control Plan lacks details for the installation and maintenance of stabilized construction entrances. Add details showing how they should be constructed and maintained. Consider adding specific instructions on how to install silt fences and what material is required rather than referring to the Pennsylvania regulations and guidance documents. Add details such as the need and method to wash truck tires before they exit the site.

89. No decontamination area is highlighted on any of the drawings. Considering the vehicle entrances and exits (as denoted by the stabilized construction entrances) are highlighted, the vehicle and personnel decontamination areas should be identified.

90. The document does not include a traffic control plan. Although this project will be contained largely within the Constantia/Stabilus property, some level of guidance should be given to govern on-site vehicle movement, any necessary signage, and the entrance onto and exit from public roadways.

HGL Specific Comments

91. Page 8, Section 2.2, last paragraph – Document approvals cited in this paragraph were approved upon incorporation of EPA comments. Please rewrite this paragraph.

92. Page 12, Section 4.1, first paragraph, second sentence – Please modify the text to specify the buffering solution that will be used.

93. Pages 15, Section 4.1, third paragraph – While movement along the bedrock/overburden interface is likely if the description of this zone of higher permeability is accurate, the document does not describe what mechanism would then drive amendments up into the lower permeability contaminated overburden after it has spread along the interface.

Please modify the text to address these issues and consider other methods of delivering amendment to the contaminated low permeability overburden areas. This comment also was made on the 60% Design Submittal, and it was not fully addressed.

94. Page 19, Section 4.3.2 and subsections – The purpose of Section 4.3.2 is to identify the goal and rationale for each remedy performance indicator. Subsections 4.3.2.1, 4.3.2.2, and 4.3.2.3 list as performance indicators total organic carbon (TOC) concentration, oxidation-reduction potential (ORP), and bioaugmentation survival and growth, but do not specify the goals that these indicators should achieve. Subsection 4.3.2.4 identifies TCE degradation as a performance indicator and describes how TCE and its daughter products may be degraded, but does not identify specific goals with respect to changes in concentrations of TCE and daughter products. Please describe the qualitative and/or quantitative goals for each performance indicator.

95. Page 21, Section 4.3.3, first paragraph, last sentence – Indicate whether injection locations will be flushed with water or whether some amendment will be added. This comment also was made on the 60% Design Submittal, and it was not fully addressed.

96. Page 23, Section 5.1.1, second bullet – It is not clear why a maximum saturated thickness of 5 feet was assumed. Section 2.1.3 indicates that the thickness of the saturated zone historically has been between 3 feet and 10 feet. A table or figure showing the observed or calculated saturated zone thicknesses should be added to back up this assumption as it impacts the ensuing design calculations. This comment also was made on the 60% Design Submittal, and it was not fully addressed.

97. Page 28, Section 5.1.3 – The document indicates that after multiple batches have been injected, one batch will be bioaugmented then the remaining batches will be injected. How will the sequence and timing of the bioaugmented batch be determined? Will it be based on monitoring of field parameter in the overburden wells located near the trench centerline?

98. Page 28, Section 5.1.4 – Please indicate how the design for a dilution water treatment system will be documented and submitted for approval prior to installation. The information contained in this section is insufficient.

99. Page 30, Section 5.2.1, third paragraph – The geotechnical analysis was conducted on only one sample from one boring; therefore, the statement the "overburden soil is consistent across the Site" is not supported. Provide the basis of this determination in the 90% design submittal. This comment also was made on the 60% Design Submittal, and it was not fully addressed.

100. Page 34, Section 7.1 – This section identifies a "potential" shake-down period. Please indicate with certainty whether this testing will occur, and, if so, please identify where the procedures to be conducted during the testing phase are described.

101. Page 36, Section 7.5, second bullet – For wells 50 feet from the EVO injection trench, the performance goal is only that TOC is detected. Because TOC can occur naturally, the detection of TOC alone is not a good indicator of whether the requisite lateral distribution has been achieved. In addition, low TOC concentrations may not be sufficient to sustain contaminant degradation. Please provide a quantitative or numerical goal that the TOC concentration in distal wells must meet.

102. Page 36, Section 7.5, ninth bullet – The criteria specify only that methane must be detected. Methane can occur naturally in some aquifers. In addition, methane can be detected at low concentrations following substrate injection even when the amendment distribution or quantity is not sufficient to sustain reductive dechlorination. Please provide a quantitative goal for methane.

103. Page 36, Section 7.5, second to last bullet – This bullet identifies that there should be evidence of daughter products. Given the potential for the reduction process to stall at cis-1,2-DCE, please include criteria for daughter product degradation.

104. Page 44, Section 9.2.1, fourth and eighth bullets – The fourth bullet alludes to a data gap with respect to plume delineation. Please include in Section 2, the background information section, a discussion of the data gaps that must be addressed before implementation of the remedial design. The eighth bullet identifies characterization of the Phase I trench. Please identify what 'characterization' activities will occur for the Phase I trench.

105. Page 50, Section 9.3.6, first paragraph – The 100 µg/L contour is not defined to the north of TW49 or to the southwest of TW50 and will not be by the proposed additional samples. Add groundwater samples to the north of TW49 and to the southwest of TW50.

106. Page 50, Section 9.3.6 – Please indicate whether additional samples will be collected if the grab groundwater samples at TW52 and TW53 do not delineate TCE to 100 micrograms per liter (µg/L).

107. Section 9.3.10 – On page 53, the remedial design states that the target depth for the shallow bedrock monitoring wells is 50 feet below ground surface (bgs). On page 54, the remedial design states that the construction specifications for the shallow wells will be based on borehole data from the intermediate bedrock well. The latter text is inconsistent with pre-defining the shallow well depth to 50 feet bgs. Please adjust text to resolve this inconsistency.

108. Pages 54 and 55, Section 9.3.10 – Schedule 80 PVC is not required for these well depths. Explain the need for this material. This comment was made on the 60% design submittal, and it was not fully addressed.

109. Section 9.3.10 – Please confirm that the bullets starting on page 55 and ending on page 56 correspond to the planned bedrock well construction. For example, the fifth bullet refers to Schedule 40 PVC, the sixth bullet refers to 1-inch diameter well screen and riser, and the ninth bullet refers to a pre-packed well screen. These are inconsistent with the preceding bullets describing the well construction. This comment also applies to bullets describing the overburden monitoring wells at the bottom of page 58 and top of page 59. Suggest removing the parenthetical notes from the bullets to avoid inconsistencies between bullets and well construction specifications.

110. Page 56, Section 9.3.11.1, - Please note that the placement of the screened interval will be based in part on the results of the packer testing described in Section 9.2.11.2. Please confirm that the packer test results will be available within the 24-hour time frame for determining the screened interval listed in Section 9.3.11.1.

111. Page 57, Section 9.3.11.2 – The last sentence of this section (on page 57) specifies that 12 groundwater samples will be collected from the intermediate monitoring well borings. Given that 3 samples are planned for each of 3 borings, confirm that 12 field samples is the correct number of planned samples. It does not appear that the analytical data will be used to identify screen placement. Please describe how the VOC data will be used.

112. Page 57, Section 9.3.12 – The first paragraph identifies installation of 22 new overburden wells, but 12 new overburden wells are specified for Phase 1 and 20 are specified for Phase 2 (total of 32 new overburden wells). Please resolve this discrepancy.

113. Page 60, Section 9.3.14 – Please add surveying of the intermediate and shallow bedrock monitoring wells to the bulleted items.

114. Section 9.3.16 – The Phase I performance monitoring includes collecting groundwater samples for laboratory analysis from select intermediate and shallow bedrock monitoring wells. Phase 2 and long-term monitoring will include sampling of only the overburden monitoring wells. Although this design specifically deals with the overburden groundwater and soils, add language stating shallow and intermediate bedrock monitoring wells will be monitored during Phase 2 or long-term monitoring. This might provide valuable information as the site cleanup moves into the bedrock cleanup. It will also allow monitoring of the effect that increasing the overburden head has on the contaminant distribution in the bedrock.

115. Page 69, Section 9.5 – Please modify the second and third bullets to reflect actual sampling designations for this phase of the project. It is doubtful that any SB-designated samples will be collected, and groundwater samples will be retrieved from more than just the TW locations.

116. Section 15.3 – The section indicates that one composite sample will be collected from the rolloff. State how many rolloffs will be required for the trench spoils. If more than one, please clarify that a composite sample will be collected from each rolloff.

117. Table 2 – Per Section 5.1.2.3, the Phase 1 design volume is 56,100 gallons. Table 2, row 1, lists a design volume of 100,000 gallons. Please resolve this apparent discrepancy.

118. Table 3, Waste Profiling – The table lists only one soil IDW sample and one water IDW sample. State the number of drums and rolloff containers of IDW that will be generated during field activities, then confirm that only one composite soil sample and one composite water sample is sufficient for waste characterization. Alternatively, please identify the appropriate frequency that will be used for waste characterization.

119. Figures – Please add groundwater potentiometric contour maps and also include groundwater flow directions on the figures that present the TCE plume.

120. Figures 4 and 8 – Replace "delineation" with "plume" or "concentrations" in the title of Figure 4. Eliminate "delineation" from the Figure 8 title.

121. Figures 5 and 6 – Eliminate these figures. While they show historical features and/or data, they do not add to the Phase 1 or Phase 2 designs.

122. Drawing 10, Well Construction Details – Ensure that the construction details on this drawing match the description in the text (see Section 9.3.10 for bedrock monitoring wells and Section 9.3.12 for overburden monitoring wells). For example, page 55 specifies a 10-foot screen for the bedrock monitoring wells, but drawing 10 does not specify the length of screened interval, nor does it show the No. 01 sand pack extending 2 feet above the top of the well screen. The overburden well is shown having 1 foot of No. 01 sand pack above the top of the well screen, but page 58 identifies 2 feet. On the detail for the Phase 1 EISB wells, please confirm that the arrows for filter sand packs and bentonite chips are pointing toward the correct locations.

123. Drawing 11 – There are two sections labeled A and two sections labeled B. Please correct the labeling.

124. Drawing 11, Part B (Well Installation) – Modify Statement 7 to indicate that the final well locations require approval by EPA before installation.

125. Drawing 11, Part B, Note 2 – The Phase 2 wells are PMW-13 through PMW-32, not PMW-12 through PMW-32.

126. Drawing 11, Part C, Note 16 – This note refers to management of water generated during trench excavation. Section 15, Waste Management Plan, does not identify this potential waste stream. Please include water removed from the trench excavation in Section 15.

127. Drawing 12 – Consider extending the silt fence around the southwest end of the Phase 2 trenching area—the ground surface slopes in that direction, and runoff is likely.

HGL General Requirements Specifications

128. General – Suggest making these documents more site specific and eliminating phrases such as "if applicable". Eliminate references to abrasive retrieval and abrasive bags if they do not apply.

129. General – Reference is made to the "Owner's Representative" throughout the specifications, but this term is not defined in the specifications of the rest of the document. Add definitions of Contractor, Owner's Representative, Owner, Field Observer, and other personnel or groups involved with the project.

130. Section 01 14 19, Part 1.04.C – Define what "suitable" protection entails.

131. Section 01 14 19, Part 1.05 – This part is titled "Quality Control", but the entries under it do not really deal with quality control. Suggest changing the title.

132. Section 01 14 30, Part 3.01 – Replace "inferred" with implied.

133. Section 01 45 16, Part 1.05.B.1 – The specification does not indicate that the contractor should cease work upon the discovery of cultural resources, only that the Engineer be notified. The potential delays in not being able to contact the Engineer could lead to the destruction of cultural resources. The specification should be changed to read: During the excavation work, if potential cultural resource items are discovered, the CONTRACTOR should immediately stop work in the area of the cultural resource item until the ENGINEER can be contacted and a decision issued regarding work in the area."

Concrete Specifications

134. Section 03 11 00, Part 3.F – The second item under this Part begins "Control cylinders shall be as possible so they receive the same curing..." Correct the wording so that the meaning is clearer.

135. Section 03 30 00, Part 1.06.A – Please fix the numbering of the items in this part.

Electrical Specifications

136. Section 26 00 00, General – The power supply listed in Section 40 95 13 is a 480 volt input unit, but the required voltage of the feed is not indicated in this section. Modify the Section to reflect this fact. Additionally, modify the drawings to clearly show that a 480 volt input is required.

137. Section 26 00 00, Part 1.03.A – Please add state and local codes.

138. Section 26 00 00, Part 2.01.G – Unless the system is required to be explosion proof, the types of seals listed are not necessary. Please correct to make the seals consistent with the system.

139. Section 26 00 00, Part 2.08.C – It is unclear why the sprinkler timer specification is included. Specify what this timer will be used for, or remove the item from the specification.

140. Section 26 00 00, Part 3.02.C – The appropriate wire colors for a 480 volt system are brown, orange, and yellow. Please include these colors to correctly reflect the appropriate voltage for the listed power supply.

141. Section 26 05 00, Part 1.03.A – Please add state and local codes.

Earthwork Specifications

142. General – Suggest removing requirements or clauses that are not pertinent to the site-specific remedial design and requirements that are redundant.

143. Section 31 00 00, Part 1.06 – This section describes the trench as being 15 feet deep. To be consistent with the remedial design, please revise to indicate that the depth of the trench will vary depending on depth to bedrock, and that the trench must extend to the top of bedrock.

144. Section 31 00 00, Part 2.04 – Suggest that testing of fill material include chemical analysis to confirm that the material is not contaminated. If chemical testing will not be performed, please describe how the Contractor will demonstrate that the fill material is not contaminated.

145. Section 31 00 00, Part 3.06.A.7 – Please confirm that this subpart applies to trench construction.

146. Section 31 22 00, Part B.2 – Please ensure that the specifications stipulate waste characterization of all material that is excavated from the site and disposed of off-site.

147. Section 31 23 16, Part 1.04.A – A location designated for stockpiling excavated soil to be reused as backfill could not be found on the drawings. Suggest adding that information to the drawings.

148. Section 31 23 19 – Please add waste characterization requirements for any groundwater or storm water mixed with groundwater removed from the excavation.

149. Section 31 25 00 – The provided Sediment and Erosion Control specification is generic and should be rewritten to address this site.

150. Section 31 41 33 – Drawing 8 indicated the Contractor could use guar for excavation protection. The trench shielding section did not mention use of liquid shoring. Suggest clarifying whether use of guar gum slurry will be allowed.

Exterior Improvements Specifications

151. General – No fertilizer or watering frequency are specified in either specification. Please modify to indicate what specific fertilizer will be used and how frequently watering will be required.

152. Section 32 90 00, Part 2.01 – No plantings are called for on the drawings. As a result, this Part is irrelevant and can be removed.

153. Section 32 92 00, Part 2.01 – Consider adding "as approved by the OWNER'S REPRESENTATIVE" to the end of the sentence or indicate what specific seed mixture will be required to ensure native grasses are grown.

154. Section 32 92 00, Part 3.02 – Indicate what will constitute completion of site restoration. Will 70% revegetation be required? 80%?

Process Integration Specifications

155. Section 40 90 00, Part 1.03.A – Please add state and local codes.

156. Section 40 90 00, Part 2.01.A – This Part calls for NEMA 4X equipment in outdoor and wet conditions, but Division 26 calls for NEMA 4. Please modify the specifications to be consistent.

Process Gas and Liquid Handling Equipment Specifications

157. Section 43 21 13, Part 2.01 – Section 40 90 00 Part 1.06.D and Section 26 00 00 Part 3.03 provide information about requirements for variable frequency drives (VFDs). If VFDs will be used, the transfer pump should be inverter duty rated. Either change the pump specification or eliminate the earlier references to VFDs.

HGL Comments on Health and Safety Plan

Comments presented regarding the Health and Safety Plan (HASP) are only suggestions based on approaches HGL would take on its own projects. They are not intended to specify requirements that HGL will enforce to ensure a safe workplace at the North Penn Area 5 site. Establishment and enforcement of health and safety rules that govern the activities of the PRPs' personnel and contractors are solely the responsibility of the PRPs.

158. Page 22, Section 8, Project Coordinator: There does not appear to be an assigned responsibility to enforce safety requirements and ensure safe work. Suggest that the Project Coordinator be assigned this responsibility.

159. Page 22, Section 8, Site Health and Safety Officer, last bullet: Recommend daily inspections rather than weekly inspections.

160. Page 23, Section 9.2, Site Supervisor Training: Suggest revising to more accurately reflect the regulatory requirement and state "...an additional eight hours of specialized training in their current employers' health and safety program and procedures."

161. Page 24, Section 9.3, first sentence: The regulatory reference (29 CFR 1910(e) is incomplete. It is unclear what regulation is being referenced. Suggest completing the reference.

162. Page 28, Section 10.6 Inspections: The inspection frequency of "Not Applicable" conflicts with the inspection frequency specified in Section 8. As commented for Section 8, suggest that inspections should be conducted daily.

163. Page 31, Section 17 Confined Space Entry: This section requires compliance with the company's Confined Space Entry Program (Procedure HS 118). If compliance with this procedure is required, it is recommended that the procedure be attached to the HASP or the requirements excerpted and included in the HASP.

164. Appendix B, Task 3 Oversight of Clearing and Grubbing, Hazardous Waste Site Work: Recommend that the statement regarding the need for 40-hour training, refresher, and medical exam include a clear positive or negative statement regarding whether the employee(s) performing this task must meet these requirements. The current statement is ambiguous.

165. Appendix B, Task 4 Overburden Groundwater Delineation, West of TW49 and TW50: Recommend replacing "constrain" in the Scope of Work Summary with more accurate wording such as "define" or "determine" or "verify".

166. Appendix B, Task 4 Overburden Groundwater Delineation, West of TW49 and TW50, Hazard Controls for "Clear drilling..." row: Recommend specifying the depth to which

boreholes will be hand cleared. Recommend removing the reference to using post hole digger since using post-hole digger likely involves significant impact to any subsurface features and may breach plastic pipes or conduit.

167. Appendix B, Task 4 Overburden Groundwater Delineation, West of TW49 and TW50, Hazards and Hazard Controls for Boring installation: Suggest adding airborne overexposure as a potential hazard or removing the requirement to monitor with a PID. Suggest requiring cutting tools with shielded blades for cutting the acetate sleeves.

168. Appendix B, Task 4 Overburden Groundwater Delineation, West of TW49 and TW50, Excavations/Trenching...section: The requirement for hand digging conflicts with the Hazard Controls required for Boring installation. Suggest rewording for consistency.

169. Appendix B, Task 4 Overburden Groundwater Delineation, West of TW49 and TW50, Hazardous Waste Site Work: Suggest clearly stating whether 40-hour training, 8-hour refresher, and medical exam are required or not required, for this task.

170. Appendix B, Task 5: This THA is currently titled Installation of Intermediate Bedrock Wells and Characterization Activities rather than oversight of such work. The Scope of Work Summary indicates that Geosyntec will oversee this work. Suggest rewording to eliminate this conflict.

171. Appendix B, Task 5 Installation of Intermediate Bedrock Wells and Characterization Activities, Work step 2, Clear drilling locations, Hazard Controls: The depth of hand-clearing should be specified. Suggest eliminating the reference to post-hole diggers as that is not a low-impact technique.

172. Appendix B, Task 5, Hazardous Waste Site Work section: The statement regarding the need for hazardous waste training and medical surveillance is ambiguous. The THA should state whether these requirements apply or do not apply. This section indicates that air monitoring will be conducted in the work area. If this is the case, the section which lists job steps should be revised to indicate which job steps will require air monitoring.

173. Appendix B, Task 6, Installation of Application Trench for EISB Remedy, Work Step 2 Dig Trenches: If personnel will enter or work close to the trench excavation, cave-in is a serious hazard. If personnel will enter or work close to the trench excavation cave-in should be listed as a hazard and appropriate hazard controls including but not limited to the following should be included; excavation competent person, daily inspections, trench sloping or shoring, safe means for ingress/egress, etc.

174. Appendix B, Task 6, Installation of Application Trench for EISB Remedy, Hazardous Waste Site Work section: Specify whether hazardous waste training and medical surveillance is

required or is not required. This section requires air monitoring. Air monitoring is not currently listed as required for Work Step 1 or 2. Suggest revising to indicate which step or steps require air monitoring.

175. Appendix B, Task 7, Construction and Installation of Remedial Equipment: Recommend that the title be changed to reflect that the THA covers oversight of this task. The specified hazard controls are insufficient for the performance (as opposed to oversight) of this task.

176. Appendix B, Task 7, Construction and Installation of Remedial Equipment, Hazardous Waste Site Work section: Suggest that this section specify whether hazardous waste training and medical surveillance is required or is not required.

177. Appendix B, Task 8, Installation of Shallow Bedrock Wells: Suggest that title be revised to indicate that the THA addresses oversight of this task.

178. Appendix B, Task 8, Installation of Shallow Bedrock Wells, Work Step 2 Clear drilling locations...: The depth of hand-clearing required at Work Step 2 should be specified. Suggest that reference to post-hole diggers be removed as that is not a low-impact technique.

179. Appendix B, Task 8, Installation of Shallow Bedrock Wells, Hazardous Waste Site Work section: This section should specify whether hazardous waste training and medical surveillance is required or is not required for this task. This section requires air monitoring so one or more of the work steps should also indicate that air monitoring is required.

180. Appendix B, Task 9, Installation of Geotechnical Boring and Overburden Performance Monitoring Wells: Suggest that title be revised to indicate that the THA addresses oversight of this task.

181. Appendix B, Task 9, Installation of Geotechnical Boring and Overburden Performance Monitoring Wells, Work Step 2 Clear drilling locations...: Suggest specifying the depth of hand-clearing required at Work Step 2. Suggest removing reference to post-hole diggers as that is not a low-impact technique.

182. Appendix B, Task 9, Installation of Geotechnical Boring and Overburden Performance Monitoring Wells, Hazardous Waste Site Work section: This section should specify whether hazardous waste training and medical surveillance is required or is not required for this task. This section requires air monitoring so one or more of the work steps should also indicate that air monitoring is required.

183. Appendix B, Task 10, Well Development, Hazardous Waste Site Work section: This section should specify whether hazardous waste training and medical surveillance is required or is

not required for this task. This section requires air monitoring so one or more of the work steps should also indicate that air monitoring is required.

184. Appendix B, Task 11, Traffic Control during Delivery of Equipment and Bioamendment Totes, Hazardous Waste Site Work section: This section should specify whether hazardous waste training and medical surveillance is required or is not required for this task.

185. Appendix B, Task 12, Implementation of the EISB Remedy, Work Step 1, Hazard Control: Controls for electrical hazards should also include connecting through ground fault circuit interrupters, inspecting electrical cords and equipment (and taking frayed or damaged equipment out of service), keeping electrical cords out of water, etc.

186. Appendix B, Task 12, Implementation of the EISB Remedy, Hazardous Waste Site Work section: This section should specify whether hazardous waste training and medical surveillance is required or is not required for this task. This section specifies that air monitoring will be conducted so one of more of the work steps should be revised to require air monitoring.

Quality Assurance Project Plan (QAPP)

187. General: This document is formatted in the UFP-QAPP format; however, it was noted that the worksheets are from the 2005 guidance document and are not the 2012 optimized worksheets. Use of the 2012 optimized worksheets and guidance is preferred as it eliminates 10 worksheets, and avoids redundant material. This is not considered a deficiency and this comment is provided for information purposes only.

188. Worksheet #1, second bullet: The reference for the 2012 optimized worksheets is: "Part 2A (Revised) Optimized UFP-QAPP Worksheets, March 2012". This is not considered a deficiency and this comment is provided for information purposes only.

189. Worksheet #3:

a. Standardize references to Sharon Fang as Remedial Project Manager and abbreviate as RPM.

b. Identify Mr. Tomlinson as Project Manager/Project Coordinator consistently throughout this document.

190. Worksheet #4: Include additional signatures for Project Coordinator, Project Geologist, and Project Engineer listed in Worksheet #3. This worksheet should also indicate that additional sheets will be signed by Geosyntec field scientists and field technicians and that these signatures will be maintained in the project file.

191. Worksheet #5:

a. This organizational chart contains several TBDs. These personnel should be identified in the final version of this document.

b. The Project Chemist should be indicated as reporting directly to the project manager rather than to the QA Manager.

c. Standardize references to Ms. Caprio as either QA Manager or QA Officer throughout document.

192. Worksheet #6

a. Real-time modifications, notifications, and approvals row: Note that real-time changes to the QAPP will require concurrence by the RPM; specify a time frame for communicating these changes to the EPA.

b. Community relations row: No community relations activities should occur without the involvement of the PM/PC and the RPM except by prior RPM consent.

c. Schedule changes row: Include a time frame for reporting schedule changes to the RPM.

d. Data release row: As the PM and the PC are the same person, the procedure as written is redundant. The Project Chemist should be involved with data review prior to release, rather than the QA officer.

e. Real-time changes to sample collection or analysis procedures row: The Project Chemist should be included as one of the personnel. Also, procedure should indicate that these changes must be approved by the RPM.

f. Reporting of issues related to Data Quality, including inability to meet reporting limits row: The Project Chemist should be the principal point of contact listed in "Procedure". Also, the procedure should indicate a time frame for reporting these issues to the RPM.

g. Corrective Action row: Include a time frame for reporting discrepancies and corrective action to the RPM.

193. Worksheet #10: Background Information cell: Suggest replacing the term "USEPA Regions 3, 6, 9 PGW-MCL" with "USEPA MCL-Based PGW SSL (November 2013)".

194. Worksheet #11:

a. Step 2: Sulfide is listed as an analyte in this worksheet; however, sulfide is not included in any of the sample collection or analysis worksheets (such as 12, 15, 18, 19, 20, or23) or in the laboratory SOP appendix. If sulfide is an analyte of concern for this project, all relevant information must be added to the relevant QAPP worksheets.

b. Step 7: The title of step, "Optimize the Design for Obtaining Data" uses terminology from the outdated 2000 DQO guidance. Revise the name of Step 7 to "Develop the Plan for Obtaining Data" as presented in the current 2006 DQO guidance, which supersedes the 2000 DQO guidance. All other steps are correctly named.

195. Worksheet #12, VOCs Table:

a. Header: The header for this table indicates that it is applicable to both soil and groundwater sampling; however, Worksheet #18 shows that only groundwater samples will be collected. Does the soil matrix address IDW generated during well installation described in Worksheet #17? Field SOPs 200 and 240, which are assumed to be associated with soil sampling, are referenced as sampling SOPs but are not included with the field SOPs presented in Worksheet #21. Correct these worksheets for consistency.

b. Initial Calibration row: The measurement performance criteria appear to be taken from the SOP for a laboratory not used for this project (TA Pittsburgh) and not the actual project laboratory, Lancaster Laboratories. Note that laboratory SOPs in Appendix A do not include the Lancaster SOP for VOCs in water, only for VOCs in soil; however, the analytical system details are not expected to vary substantively. Recommend changing the measurement performance criteria to "For each analyte: %RSD ≤15% for average RRF; if calibrated to a curve, correlation coefficient or coefficient of determination ≥0.990." SPCC and CCC calibration criteria are more appropriately discussed in Worksheet #24.

c. Initial Calibration Verification and Continuing Calibration Verification rows: As with initial calibration, the measurement performance criteria appear to be copied from the SOP of a laboratory not involved with this project. Recommend changing the measurement performance criteria to "For each CCC, %D ≤20%; for each analyte, %D ≤50%,"matching the requirements of Lancaster's SOP.

d. Field Duplicate row: No solid/sediment/tissue samples or surface water samples are listed in the worksheet. Revise the MPC to read: "30% RPD".

e. Laboratory Control Samples row: Revise the MPC to read "Percent recovery within laboratory historical control limits."

f. Add a row for Surrogates, with a frequency of "Each sample, standard, and blank", a DQI of "Accuracy", an MPC of "Surrogate recoveries must be within historical control limits" and the assessment to "A".

g. Add rows for "Equipment blank" and "Field blank"; add the equipment blank footnote from the anions table (with editorial correction) to the VOCs table.

196. Worksheet #12, Anions table:

a. Field Duplicate row: According to Worksheet #20, no field duplicate samples, MS/MSD pairs, or equipment blanks will be collected for anions. Correct this to show frequency of collection.

b. Footnote 1: Editorial – Revise "disposal" to "disposable"; if it is confirmed that no equipment blanks will be collected for anions, delete this footnote.

197. Worksheet #12, Dissolved Gases table: According to Worksheet #20, no field duplicate samples, MS/MSD pairs, or equipment blanks will be collected for dissolved gases. Correct this to show frequency of collection.

198. Worksheet #12, Alkalinity table:

a. The initial calibration MPC appears to be incorrect. The Lancaster SOP does not indicate an initial calibration is performed for alkalinity. Reconcile.

b. The continuing calibration MPC appears to be incorrect. The Lancaster SOP indicates that the CCV for alkalinity is a pH check with a pH = 6.86 buffer solution. Acceptance criteria of 90-110% is not appropriate for pH. Reconcile.

199. Worksheet #12, TOC table: According to Worksheet #20, no field duplicate samples or MS/MSD pairs will be collected for TOC. Reconcile.

200. Worksheet #14, Analytical Tasks cell:

a. Capitalize the "c" in "5310c".

b. Delete the "SOM 1.2" from the VOCs method.

c. Revise the first "MNA Parameters" bullet to read: "Nitrate, nitrite, sulfate by USEPA Method 300.0."

d. Revise the alkalinity method to "SM 2320B".

e. Delete the sulfate and anions bullets (third and fifth bullets).

f. Does sulfide need to be added to the listed analyses? See QAPP comment 11a.

201. Worksheet #15, sensitivity tables:

a. The listed source for all PALs is "EPA Region 3 Risk Based SSLs". This is incorrect, as all listed PALs are the associated MCLs. Correct this source reference.

b. There are several items with "*" or "2" without a corresponding footnote. Add footnotes explaining what all worksheet item flags mean.

202. Worksheet #15A (VOCs):

a. The listed PAL for vinyl chloride is less than the associated laboratory PQL. The QAPP should discuss the potential effects on DQOs.

b. In general, the laboratory PQLs and MDLs listed in this table seem rather high compared to what is usually available from commercial laboratories. Confirm that they are correct, or consider revising to those that are commercially available.

c. The VOCs sensitivity table presents target compounds for which no PAL is listed, including many for which there is a corresponding tap water RSL. State whether the tap water RSL will be used as the PAL for these compounds if no MCL is available.

d. Consider reducing the VOCs list to the site contaminants of concern after initial sampling rounds.

e. Include the required surrogate compounds and surrogate acceptance criteria in the table that presents the accuracy control limits.

203. Worksheet #15B (EISB parameters):

a. Delete chloride from these tables, or include a rationale for chloride analysis in Worksheet #11.

b. Revise the PAL for sulfate to "250 mg/L"; the PAL source for sulfate is "National Secondary Drinking Water Regulations".

204. Worksheet #18: Field duplicate locations are indicated only for pre-EISB samples. Indicate other locations for field duplicate samples, and populate the rest of the cells with the number of samples.

205. Worksheet #19, anions row: Delete PO4 from the holding time cell; this anion will not be analyzed for this project.

206. Worksheet #20:

a. This worksheet groups the baseline monitoring with the Phase 1 performance monitoring. Worksheet #18 indicates that baseline monitoring is in the pre-EISB project phase. Either grouping is acceptable for the baseline monitoring; however, the two worksheets need to be consistent. Revise accordingly.

b. It is recommended that the estimated number of QA samples be included in each cell along with the collection rate. Note that an MS/MSD pair counts as 2 samples; the total number of samples indicated for Overburden Delineation looks like it has been calculated using only 1 for the MS/MSDs.

207. Worksheet #21: If soil IDW samples will be collected, include the appropriate sampling SOPs.

208. Worksheet #22, General: The terms "Owner's Manual" and "User's Manual" are used interchangeably in the instrument-specific tables. Suggest standardizing to "User's Manual."

209. Worksheet #22, YSI 6 Series Data Sonde table:

a. Inspection cell: The statement "YSIs deployed for long-term monitoring are cleaned and calibrated on a routine basis" requires elaboration. What is the frequency of cleaning and calibration? If this is presented one of the field SOPs listed in Worksheet #21, it is acceptable to reference the SOP for frequency.

b. Acceptance cell: The acceptance criteria for turbidity are somewhat confusing. Recommend revising presentation to "Readings <100 NTU: ±0.05 NTU or ±2%, whichever is greater. Readings ≥100 NTU: ±3%." Also, adjust the justification of the acceptance criteria presented after the page break.

c. SOP Reference cell: This cell is blank. Please provide the SOP reference.

210. Worksheet #22, MiniRAE 2000 table:

a. Calibration cell: Delete the statement "... and performed in accordance with worksheets #24 and #25." The referenced worksheets are intended to provide details for laboratory equipment; all relevant information for field equipment, including the PID, should be provided in Worksheet #22. The statement is also incorrect, as the referenced worksheets do not contain any information on PID calibration.

b. SOP Reference cell: This cell is blank. Please provide the SOP reference.

211. Worksheet #22, LaMotte Turbidity Meter Model 2020 table:

a. If a LaMotte turbidity meter will be used, delete the references to turbidity meter in the YSI Series 6 table.

b. Maintenance cell: Please indicate the type of alcohol used to clean the meter. Is cosmetic-grade isopropyl alcohol acceptable?

c. Acceptance cell: Delete the statement: "An averaging option allows the user to average multiple readings, thereby increasing the accuracy of samples with readings that may tend to drift with time." It is unclear how averaging an initial correct reading with additional readings that have drifted will increase accuracy. Clarify.

d. SOP Reference cell: This cell is blank. Please provide the SOP reference.

212. Worksheet #23:

a. Suggest using a smaller font for the column headers and increasing the column width for "Title, Revision Date, and /or Number" to improve overall readability.

b. SOP 1-P-QM-WI-9015141 (VOCs in water): This SOP is not provided in the SOPs appendix.

c. If soil samples will be analyzed for VOCs (waste characterization?), then list the VOCs in soil SOP that is currently included in the SOPs appendix; otherwise, please delete this SOP from the Appendix.

213. Worksheet #24:

a. The introductory text for this table appears to be from the instructions included in a template worksheet and should be deleted.

b. The acceptance criteria and corrective action cells appear to have been copied and pasted verbatim from the laboratory SOP. As a result, the table cells in some cases run on to multiple pages. The presented criteria should be summarized for brevity and information not relevant to project analyses (such as SOP modifications for South Carolina compliance samples) should be removed.

c. The acceptance criteria and corrective action cells for GC/MS initial calibration, initial calibration verification, and daily calibration verification have extraneous hard returns which contribute to the excessive cell length. These hard returns in the middle of text should be deleted.

214. Worksheet #25:

a. The worksheet title is misplaced and should precede the two table rows at the bottom of page 65.

b. Adjust column widths or use hyphenation to eliminate words wrapping around to the next line.

215. Worksheet #26:

a. The first two rows of this table have text cut off. Please complete "Field PM, Geosyntec Sample" and "Field PM, Geosyntec Coordination of".

b. The first row under Sample Disposal has the phrase "Sample Receiving Personnel" is repeated; delete the repeated row.

c. This worksheet is repeated on the next page; delete the repeated worksheet.

216. Worksheet #27, Sample Identification Procedures section:

a. Are the second and third bullets intended to be examples of sample IDs? It is unclear how the second and third bullets fit with what is stated in the first bullet.

b. Recommend providing a full example of a sample ID using one of the samples listed in Worksheet #18 with a "dummy" sample date.

217. Worksheet #28:

a. Relatively little information is presented on each page in part because of the table format. Recommend dividing this worksheet into a sub-worksheet for each method (e.g., numbering them 28.1, 28.2, et seq.) and including a subtitle (such as "Dissolved Gases" or "Volatile Organic Compounds"). Only include the method informational header information on the first page for each sub-worksheet.

b. State the actual SOP # associated with each table rather than a reference to Worksheet #23.

c. The acceptance criteria and corrective action cells appear to have been copied and pasted verbatim from the laboratory SOP. The information presented is overly detailed and as a result, the table cells in some cases run on to multiple pages. For example, the surrogate recovery corrective action takes 6 pages to present a single table cell. The presented criteria should be summarized for brevity.

d. The table contains generic information, such as the statement in the corrective action cell of the dissolved gases surrogate row: "Some programs (e.g., USACE) may require additional analyses to confirm suspected matrix interferences." Either replace statements such as this with the actual programmatic requirements for this project or delete such terms.

218. Worksheet #29:

a. Field Documentation, last paragraph: "If the changes are not significant (e.g., a sample or boring location is moved from the planned location, or additional samples are collected that were not specified in this QAPP), the USEPA Region 3 will be notified in the monthly progress report." It is recommended that non-significant changes be informally communicated to the EPA via email on a timely basis; specify a time frame for communication, which should match the time frame specified in response to QAPP comment 7a above.

b. Data Package Format, first paragraph: Replace the statement: "EDDs will be delivered in the appropriate format per USEPA Region 3 requirements as applicable" with the specific project EDD format(s) required for this project.

219. Worksheet #30: Include laboratory addresses and contact information in the "Laboratory/Organization" column.

220. Worksheet #31: The introductory text for this table appears to be from the instructions included in a template worksheet and should be deleted.

221. Worksheet #32:

a. The introductory text for this table appears to be from the instructions included in a template worksheet and should be deleted.

b. Section 2.0: Replace the statement "Each laboratory selected to support this project must maintain current NELAP or Federal certifications and EPA Region 3 approval, as appropriate" with the actual certification requirements for the project. It is understood that some methods, such as Dhc, will have less rigorous certification requirements.

c. Section 2.1.1, first paragraph: In the text "A non-conformance is defined as an identified or suspected deficiency or discrepancy with regard to an approved document (e.g., improper sampling procedures, improper instrument calibration, calculation, computer program)", suggest "calculation error" to replace "calculation". "Computer program" needs to be clarified as it unclear why this term is used in this context.

d. Section 2.1.1, last paragraph: Specify a time frame for communication of discrepancies and corrective action to the RPM, which should match the time-frame specified in response to QAPP comment 7g above.

222. Worksheet #33, CA Reports row: Change frequency to "Generated on the resolution of identified discrepancies" and change delivery date to "Immediately on completion". It is recommended that the responsible person be changed to the PM and that the report recipients be changed to the QA manager, the RPM, and the project file.

223. Worksheet #34

a. Planning Documents row: Change "QAPP documents" to "Project planning documents". Include designs, specifications, health and safety procedures, and work plans in the list of reviewed items.

b. Field Data row: Change "QAPP documents" to "project planning documents".

c. CoC Documentation row: Change "I" to "I/E". Include the laboratory sample receiving manager in the Responsible for Verification column.

d. CoC Documentation row: Change "I" to "I/E". Include the laboratory PM in the Responsible for Verification column.

e. EDD row: Change "I" to "I/E". Include the laboratory database manager in the Responsible for Verification column.

f. EDD row: The text in Description includes a reference to ERPIMS, which is an Air Force EDD format. Review this cell and ensure that it presents guidance appropriate to the actual project EDD requirements, which should match the requirements specified in response to QAPP comment 29b above.

g. Data Verification text: Recommend changing the last sentence to read: "It is the responsibility of the assigned laboratory personnel to thoroughly review the data package and to record any deviations that may have occurred in the case narrative. Not data will be released to Geosyntec until all internal review and approval processes are complete."

h. Data Review Process (Steps I, IIa, and IIb): Insert introductory text before the table indicating who is responsible for conducting the steps presented in the table.

224. Worksheet #35:

a. Sampling plans, location, maps, grids, and sample ID numbers row: Delete "Data Validation/Chemist" from the Responsible Personnel cell.

b. Sampling/Field Documents row: Delete "Data Validation/Chemist" from the Responsible Personnel cell.

c. Text, first paragraph: Revise "compliance to" to "compliance with".

225. Worksheet #36, Validation Criteria: Indicate the level of data quality (e.g., "definitive") needed to support each data source (method and matrix) required to support DQOs. Also, note that EPA Region III no longer uses its internal data validation protocols and defaults to the National Functional Guidelines.

226. Worksheet #37:

a. Section 1.2, first paragraph: While the terms "coefficient of variation" and "relative standard deviation" have the same meaning, the latter term is more widely used in analytical chemistry. RSD should be defined as "relative standard deviation"; if the term coefficient of variation is preferred in this case, abbreviate it "CV".

b. Section 1.7, second paragraph: Insert the following text after the last sentence of this paragraph: "The RL used for each analyte must be supported by an initial calibration that incorporates one or more calibration standards with concentrations at or below the reported RL."

HGL Construction Quality Assurance Plan (CQAP)

227. General – EPA should be included in the lists of parties to be notified for weekly meetings, problems/work deficiencies, and other site developments. Include time frames to confirm when EPA will be informed of these events.

228. General – Need to address the following in plan:

- Quality management organization and responsibilities;
- Communications and meetings;
- Submittals;
- Definable features of work (DFOW);
- Quality review checks;
- Inspections;
- Sampling and testing requirements;
- Material inspection, handling, and storage;
- QA/QC reporting requirements;
- Change control; and
- Noncompliance and corrective actions.

229. General – The term Contractor is used in a number of places throughout the CQAP. It's use is confusing. Modify the text to use only defined terms such as RAC or RDC as appropriate.

230. Page 1, Section 1 – Consider modifying the text to include, "Quality Assurance involves the processes and procedures employed to ensure that standards of quality are met and documented. Quality Control involves verification of activities and corrective action."

231. Page 1, Section 1.1, first sentence – Change "quality assurance" to "quality control".

232. Page 1, Section 1.1, first and second sentences – Change "constructed" to "constructed and performed".

233. Page 1, Section 1.1, second to last sentence – Modify sentence to read, "The CQAP describes responsibilities of the key members in the project organization and defines their lines of communication."

234. Page 2, Section 1.2, last bullet – Considering the entire document is the CQAP, Section 4 should be renamed.

235. Page 3, Section 2.1.3, last sentence – Add "this CQAP and other USEPA-approved remedial design documents" to the list of documents in the sentence.

236. Page 3, Section 2.1.4 – Add "ensuring ROD objectives are met" and "providing adequate and qualified personnel to oversee QA/QC activities" to the list of responsibilities for the RDC.

237. Page 3, Section 2.1.5 – Delete the second sentence of the first paragraph and the second paragraph.

238. Page 4, Section 2.2.2 – Modify the section to indicate who the Resident Engineer will report to outside of the project structure (i.e., Corporate QA Officer) on matters of quality assurance.

239. Page 6, Section 3, list item 2 – Change "Collected" to "Collect" and indicate how many samples will be collected.

240. Page 6, Section 3, list item 3 – Add "in accordance with the approved plan and PADEP requirements" to the end of the item.

241. Page 6, Section 3, list item 6 – No cushion layer is included to protect the geomembrane. Please indicate how the geomembrane will be protected.

242. Page 7, Section 4 – Considering the entire document is the CQAP, Section 4 should be renamed.

243. Page 7, Section 4.1 – More than the four listed organizations are referenced in the specifications. Correct the list to include the remaining organizations.

244. Page 7, Section 4.2.1 – Change text to include the Resident Engineer and the RPM (or her representative) as mandatory attendees at the pre-construction meeting. Also, add "Discussion of anticipated means and methods, access issues, traffic control, planned QA testing, anticipated subcontractors, Utility access, dust control, etc." to the bullet list of items to be discussed.

245. Page 8, Section 4.2.1 – Change the ninth bullet to read "Establishment of soil stockpile locations and protection of stockpiles."

246. Page 8, Section 4.2.1, last sentence – Indicate that the Meeting Minutes will be taken by QA personnel and that minutes will be distributed within 72 hours of the meeting.

247. Page 8, Section 4.2.2 – No mention is made of two-week look-aheads or daily safety tailgate meetings. Please indicate how these will be handled.

248. Page 8, Section 4.2.2, first sentence – Add the RPM (or her representative) to the meeting attendees.

249. Page 8, Section 4.2.2, third sentence – Change this sentence to read, "Quality Assurance personnel will document in the meeting minutes: items discussed, potential issues, decisions, proposed means and methods of construction activities, questions and responses, and any other items of significance."

250. Page 8, Section 4.2.2, fourth sentence – Change this sentence to read, "Matters requiring action which are raised in this meeting will be captured in the Meeting Minutes as Action Items detailing responsible party."

251. Page 8, Section 4.2.2, fifth sentence – Change sentence to indicate that Meeting Minutes will be distributed within 72 hours of the meeting.

252. Page 9, Section 4.3 – Please indicate the required tolerances for the final survey.

253. Page 10, Section 4.4 – Please answer the following in the text. Who will conduct inspection of the sediment and erosion controls as well as how frequently the controls will be inspected? What qualifications will be required of the inspector? How will the inspections be documented? What precipitation events will require a follow-on inspection?

254. Page 10, Section 4.4.1 – Indicate who will review the submittals, what will happen if the materials are rejected, and the timetable for submitting.

255. Page 10, Section 4.4.1 – No mention of temporary seed or matting is made in the specifications or Sediment and Erosion Control Plan. If these items will not be used in this project, eliminate them from the text.

256. Page 11, Section 4.4,3 – Indicate what will force repairs to erosion controls, how much silt will be allowed to accumulate before the silt fence will have to be cleaned, and other information about upkeep of the E&S controls. These items are not covered in the Sediment and Erosion Control Plan.

257. Page 12, Section 4.6.1 – Eliminate the word "source(s)" from the fourth sentence of the first paragraph. Also, modify the following sentence, "chemical testing will not be required if the fill material is sourced from a quarry," to include the word gravel before the word sourced.

258. Page 13, 4.6.2 – The text states, "If the PID results indicate that the excavated soil meets the standards set forth in the Specifications," but there does not appear to be a quantitative set of standards or frequency in the listed referenced specification (Section 31 05 13). Please modify the text here or in the cited specification.

259. Page 14, Section 4.6.3 – Indicate who will inspect the heavy equipment and what will be inspected.

260. Page 14, Section 4.6.3, second bullet under Application Trench Backfill – The text indicates that CQA personnel are in charge of "verifying that excavated material conforms to the chemical standards described in the Specifications prior to reuse as backfill material," but no quantitative chemical standards are provided in the specifications. Define what chemical standards will be used to determine whether excavated material is acceptable.

261. Page 16, Section 4.7.2, fifth bullet – Indicate whether and how the geomembrane will be seamed. Who will inspect the geomembrane during placement and seaming?